REMARKS

In paragraph 1 of the Action, it was requested to add "Prior Art" in Fig. 2. As stated in the brief description of the drawings, Fig. 2 is a view for explaining a manufacturing method of the radiation detector of the invention and the conventional circuit. Also, Fig. 2 contains numeral 9 for the active matrix board of the invention in addition to numeral 10 used in the conventional active matrix board. Therefore, "Prior Art" is not required in Fig. 2. If, however, such legend is required, the legend will be added.

In paragraph 2 of the Action, claim 5 was objected to. In paragraph 4 of the Action, claims 1-4 were rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' admitted prior art in view of Huang et al. In paragraph 5 of the Action, claim 5 was rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' admitted prior art in view of Huang et al. and Yamazaki.

In view of the objection and rejections, claims 1 and 5 have been amended to clarify the structure of the invention, and claim 3 has been cancelled. Also, new claims 6 and 7 have been filed.

A radiation detector of the invention comprises an active matrix board and a converting layer. The active matrix board includes gate lines and data lines arranged in a two-dimensional lattice shape, a plurality of high-speed switching elements provided at respective lattice points and connected to the gate lines and the data lines, pixel electrodes connected to source electrodes of the high-speed switching elements, and charge storage capacitances. Each charge storage capacitance is disposed between the pixel electrode and a ground electrode. The converting layer is formed on the pixel electrodes to generate a pair of electron-hole by absorbing one of light and radiation.

In the invention, each switching element is formed of polycrystalline silicon thin film transistor, and the converting layer is formed of a material having a heat resistant temperature more than about 250°C.

Namely, the material for the converting layer is not a conventional amorphous selenium having a heat resistant temperature less than about 250°C (page 2, line 14). Preferably, the poly-silicon thin film transistor has a heat resistant temperature more than 300°C, and the material of the converting layer has a film-forming temperature higher than 300°C, as recited in claim 6. Namely, the converting layer is preferably CdTe or CdZnTe, as recited in claim 2.

In the invention, since the switching element is formed of the polycrystalline silicon thin film transistor, the converting layer can be formed of a material excellent in sensitivity for X-ray. Thus, it is possible to provide the radiation detector with low S/N ratio and preventing reduction of a dynamic ranged caused by connection of circuits.

In the admitted prior art as explained in paragraphs 0001 to 0011 of the specification, a radiation detector includes thin film transistors made of hydrogenation amorphous silicon as the switching elements, and amorphous selenium having a heat resistant temperature less than 250°C as the converting layer.

The present invention is a combination of the switching element formed of polycrystalline silicon thin film transistor, and the converting layer formed of a material having a heat resistant temperature more than about 250°C. The combination of the polycrystalline silicon thin film transistor and the specific material of the converting layer of the invention is not disclosed or suggested in the admitted prior art of the specification.

Huang et al. is directed to a TFT structure characterized by no parasitic capacitance on either the drain or the source electrode

(column 3, lines 37-39). In the invention, the sensitivity for X-ray is improved, and the radiation detector has low S/N ratio and prevents reduction of a dynamic ranged caused by connection of circuits. The object of the invention is different from that of Huang et al.

In Huang et al., it is stated that a typical TFT includes a semiconductor film fabricated from amorphous silicon, poly-silicon, cadmium selenide or other material. Also, in claim 6, the radiation detection layer is fabricated from amorphous selenium, amorphous silicon or CdTe/Cds X-ray detector.

The present invention is a specific combination of the switching element formed of polycrystalline silicon thin film transistor, and the converting layer formed of a material having a heat resistant temperature more than about 250°C. Huang et al. does not disclose the specific combination of the polycrystalline silicon thin film transistor and the converting layer of the invention. CdTe/Cds used for the radiation detection layer in Huang et al. is different from CdTe or CdZnTe of the invention.

Yamazaki was cited to show signal process circuits in Fig. 8. Although the signal process circuits are shown in Yamazaki, the specific combination of the materials of the switching element and the converting layer as recited in claim 1 of the invention is not disclosed or suggested.

As explained above, the specific combination of the present invention is not disclosed or suggested in the cited references. Even if the cited references are combined, the invention is not obvious from the cited references.

Reconsideration and allowance are earnestly solicited.

Respectfully Submitted,

HAUPTMAN KANESAKA BERNER
PATENT AGENTS, LLP

By Manabu Kanesaka

Manabu Kanesaka
Reg. No. 31,467
Agent for Applicants

1700 Diagonal Road, Suite 310
Alexandria, VA 22314
(703) 519-9785